

CLAIMS

1. An aerial recovery system for an aircraft, said system comprising;
an arrestment line held up at at least one end,
said aircraft containing a device for capturing said line,
said aircraft containing structure suitable for deflecting said line laterally into
engagement with said capturing device, said structure comprising a wing of said
aircraft.
2. The aerial recovery system of claim 1 where said line is held up by
a lifting apparatus.
3. The aerial recovery system of claim 1 where said capturing device
is a hook.
4. The aerial recovery system of claim 3 where said hook has a line
retaining device.
5. The aerial recovery system of claim 1 in which said capturing
device is positioned on a forward inboard edge of a wing of said aircraft.
6. The aerial recovery system of claim 1 in which the capturing device
is located inboard of the aircraft's wingtip.
7. The aerial recovery system of claim 6 in which the capturing device
is located inboard more than 5% of the wing semi-span.
8. The aerial recovery system of claim 1 in which multiple generally
vertically oriented arrestment lines are spaced apart across the direction of travel
of said aircraft as it approaches for recovery so as to increase the lateral capture
envelope of said recovery system.

9. The method for recovering an aircraft of claim 1 in which said line is deflected inboard relative to the aircraft.

10. The aerial recovery system of claim 1 in which said line is supported in the air by a rotor.

11. The aerial recovery system of claim 1 in which said line is supported in the air by an aircraft.

12. The recovery system of claim 1 wherein the arrestment line is held up by a device selected from the group consisting of a balloon, an aircraft, a lifting device requiring a relative wind to generate lift, and a beam.

13. The recovery system of claim 12 where said arrestment line is held up by a beam, the beam comprising a boom.

14. A method for capturing a flying object, comprising the steps of:

- a) suspending a linear or curvilinear fixture across the flight path of the object in a generally vertical orientation, or otherwise in an orientation which includes a component normal to the flight path;
- b) guiding the object to strike the fixture;
- c) allowing the subsequent motion of the object to slide the fixture along a wing or spanwise lifting surface of the flying object;
- d) intercepting the sliding of the fixture by one or more hooks attached to a wing or spanwise lifting surface of the flying object;
- e) decelerating the flying object under the restraint of the fixture; and
- f) removing the flying object from the fixture.

15. An aerial recovery system for a heavier-than-air aircraft, said system comprising,
the aircraft; and
an arrestment line held up at at least one end,
said aircraft comprising a capturing device for capturing said line and structure suitable for deflecting said line laterally into engagement with said capturing device.

16. The aerial recovery system of claim 15 wherein said structure is constructed to deflect said line laterally outboard.

17. The aerial recovery system of claim 15 wherein said arrestment line is held up by a beam.

18. In combination, a flying object and an apparatus for capturing the flying object,

the flying object having a spanwise lifting surface with a capture device,
the flying object being adapted for flying along a flight path,

the apparatus comprising:

a generally linear or curvilinear fixture positionable in the flight path of the flying object, at least a portion of the fixture being inclined at an angle relative to the spanwise lifting surface to intersect the spanwise lifting surface, the fixture having an engaging surface positioned to engage the capture device of the flying object to releasably secure the flying object to the fixture; and

a support structure coupled to the fixture and positioned to support the fixture in the flight path.

19. The combination of claim 18 wherein the fixture includes a cable or pole.

20. The combination of claim 18 wherein the support structure includes a lifting device requiring a relative wind to generate lift, a balloon, an aircraft, and a beam.

21. The combination of claim 18 wherein the capture device comprises at least one hook on the spanwise lifting surface of the flying object.

22. The combination of claim 21 wherein the at least one hook includes a latch.

23. The combination of claim 22 wherein the fixture includes a cable or pole and wherein the support structure includes a lifting device requiring a relative wind to generate lift, a balloon, an aircraft, or a beam.

24. The combination of claim 21 wherein the fixture includes a cable or pole and wherein the support structure includes a lifting device requiring a relative wind to generate lift, a balloon, an aircraft, or a beam.

25. A method for capturing a flying object comprising:
allowing a spanwise lifting surface of a flying object to strike a fixture positioned at an angle relative to the spanwise lifting surface while imparting a decelerating force to the flying object;
releasably engaging the fixture with a capture device on the flying object;
and
retrieving the flying object.

26. The method of claim 25 further comprising sliding at least one of

the spanwise lifting surface and the fixture relative to the other while the fixture contacts the spanwise lifting surface.

27. The method of claim 25 further comprising selecting the fixture to include at least one of a cable and a pole.

28. The method of claim 25 wherein positioning the fixture comprises suspending the fixture from at least one of a lifting device requiring a relative wind to generate lift, a balloon, an aircraft, and a beam.

29. The method of claim 28 further comprising selecting the fixture to include at least one of a cable and a pole, and wherein releasably engaging the fixture with the capture device comprises engaging the fixture with at least one hook on a surface of the flying object.

30. The method of claim 29 further comprising selecting the at least one hook to include a latch.

31. The method of claim 25 wherein releasably engaging the fixture with capture device comprises engaging the fixture with at least one hook on a surface of the flying object.

32. The method of claim 25 further comprising orienting the fixture at an angle approximately normal to the spanwise lifting surface.

33. The method of claim 25 wherein the fixture is operatively coupled to a floating object, and wherein the method further comprises bringing the flying object aboard the floating object.

34. In combination, a flying object and an apparatus for capturing the flying object, the combination comprising:

a) a linear or curvilinear fixture suspended across the flight path of the object in a generally vertical orientation, or otherwise in an orientation which includes a component normal to the flight path;

b) means for suspending the fixture; and

c) means attached to the flying object for intercepting the sliding of the fixture along a wing or spanwise lifting surface of the flying object.

35. (currently amended) The combination of claim 34, wherein the linear or curvilinear fixture is a cable.

36. The combination of claim 34, wherein the means for suspending the fixture is selected from the group consisting of a kite, a balloon, a kite/balloon hybrid, an aircraft, a mast, and a crane.

37. The combination of claim 34, wherein the means for intercepting the sliding of the fixture comprises at least one hook on a wing or spanwise surface of the flying object.

38. The combination of claim 34, wherein each hook includes a cleat or latch such that after the fixture is intercepted by the hook, sliding of the fixture through the hook is substantially arrested.

39. The combination of claim 34, wherein the motion of the flying object during deceleration is accommodated by compliance of the fixture.

40. A method for capturing a flying object, comprising the steps of:

a) suspending a linear or curvilinear fixture across the flight path of the object in a generally vertical orientation, or otherwise in an orientation which includes a component normal to the flight path, such that the suspension of the

fixture is kept clear of said flight path by a distance greater than the height or width of said flying object;

- b) guiding the object to strike said fixture;
- c) intercepting the fixture by one or more hooks attached to a wing or spanwise lifting surface of the flying object;
- d) decelerating the flying object under the restraint of the fixture; and
- e) removing the flying object from the fixture.

41. In combination, a flying object and an apparatus for capturing the flying object, the combination comprising:

- a) means for suspending a linear or curvilinear fixture across the flight path of the object in a generally vertical orientation, or otherwise in an orientation which includes a component normal to the flight path, such that the suspension of the fixture is kept clear of said flight path by a distance greater than the height or width of said flying object;
- b) means for suspending the fixture; and
- c) means attached to a wing or spanwise lifting surface of the flying object for intercepting the fixture.

42. The combination of claim 41, wherein the fixture is a cable.

43. The combination of claim 41, wherein the means for suspending the fixture is selected from the group consisting of a kite, a balloon, a kite/balloon hybrid, an aircraft, a mast, and a crane.

44. The combination of claim 41, wherein the means for intercepting the fixture comprises at least one hook on a wing or spanwise surface of the flying object.

45. The combination of claim 41, wherein each hook includes a cleat or latch such that after the fixture is intercepted by the hook, sliding of the fixture through the hook is substantially arrested.

46. The combination of claim 41, wherein the motion of the flying object during deceleration is accommodated by compliance of the fixture.